

## Society News



Chad Powell <http://www.isleofwightmilkyway.com/>

Summer is always a tricky time for the Society. The Island attracts a lot of visitors but the nights aren't dark and it's sometimes difficult to demonstrate just how good our night skies are.

It is very heartening though to read articles in the national press and magazines about astronomy and dark skies destinations.

As a small Island we depend on tourism and the natural beauty of "The Wight" are part of the attraction to many who visit. Astronomy extends the season for tourists who appreciate the lack of light pollution and the tranquillity here and we should do our best to protect and hopefully improve that further.

If every member of VAS could remove or reduce the impact of one bad light here on the Island we'd all benefit. Please, have a look around your neighbourhood and see what you can do, it doesn't need to be confrontational - Our mantra should continue to be:

***The right amount of light,***

***Where it is needed,***

***When it is needed***

A very simple and perhaps obvious message but one that it so often ignored.

*Brian Curd  
Editor New Zenith.*

## VAS Website: [wightastronomy.org](http://wightastronomy.org)

Submissions or letters to New Zenith are always welcome and should be sent to:

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Isle of Wight PO35 5QF**

Tel: **01983 872875** or email: [editor@wightastronomy.org](mailto:editor@wightastronomy.org)

Material for the next issue by the 6th of the month please.

The Vectis Astronomical Society and the Editor of the New Zenith accept no responsibility for advice, information or opinion expressed by contributors.

**Registered Charity No 1046091**

## Observatory Diary

Monday, 19.30hrs	Members Only and by arrangement Telescope and night sky training. Please contact Martyn Weaver 07855 116490
Thursday, 19.30hrs	Members and Public. Informal meeting and observing

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## 2016 Monthly Meetings

Date	Subject	Speaker
Please check <a href="http://wightastronomy.org/meetings/">wightastronomy.org/meetings/</a> for the latest information		
24 Jun	Solar Sails and How They Might be Used	Dr Thomas Waters
22 Jul	Ultra High-Energy Cosmic Rays	Ellis Owen
26 Aug	AGM Starts at 7pm sharp William Herschel and the Rings of Uranus	Dr Stuart Eves
23 Sep	TBC	TBC
28 Oct	TBC	TBC
25 Nov	Stellar population Modelling	Dr Claudia Maraston

## Observatory Visits Booked

Friday 1st July 8.00pm-11pm  
Hash House Harriers

It would be appreciated if members could avoid using the observatory at these times.

## A Few Facts

### Saturn's Rings

Saturn's rings are arguably the flattest structure known to man, being some 300,000 km end-to-end but with a vertical thickness of about 10 metres.

### Fuel for Thought

The Sun burns 600 million tons of Hydrogen every second.

### Polaris' Retirement

Vega will become our new north star in 12000 years.

### Drifting Away

Earth is the only planet that has plate tectonics!

## VAS Contacts 2014/15

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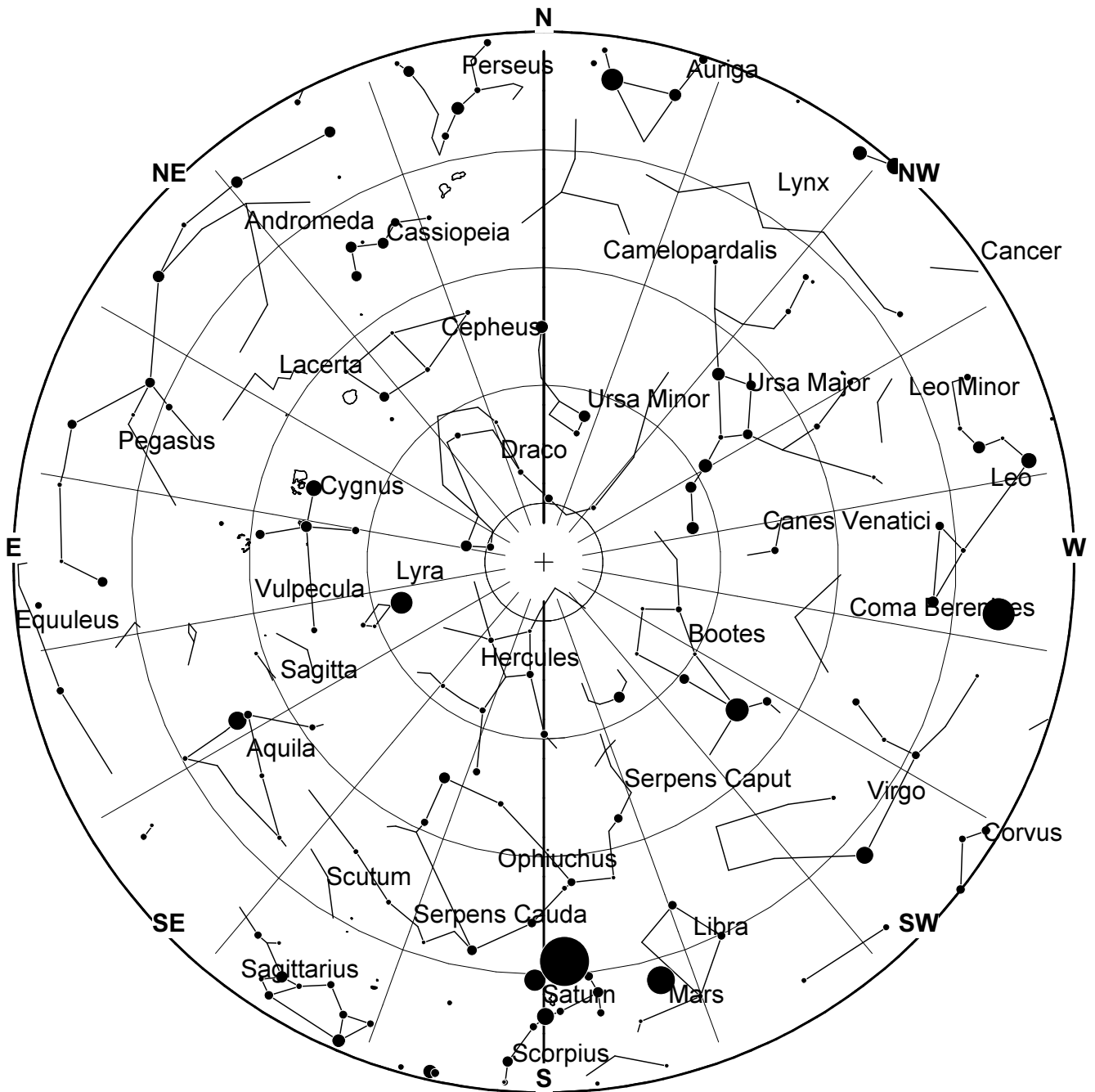
## Important

Members using the observatory outside normal Thursday meetings **MUST** enter a line or two in the Observatory Log Book.

On several occasions, lights, heaters and the Meade LX200 have been left on!

When leaving, please ensure all is secure and all lights, heaters and telescopes are **TURNED OFF**.

# July 2016 Sky Map



View from Newchurch Isle of Wight UK - 2200hrs - 15 July 2016







### Early July around midnight: look north to spot Noctilucent clouds

Noctilucent clouds, also known as polar mesospheric clouds, are most commonly seen in the deep twilight towards the north from our latitude. They are the highest clouds in the atmosphere at heights of around 80 km or 50 miles. Normally too faint to be seen, they are visible when illuminated by sunlight from below the northern horizon whilst the lower parts of the atmosphere are in shadow. They are not fully understood and are increasing in frequency, brightness and extent; some think that this might be due to climate change! So on a clear dark night as light is draining from the north western sky long after sunset take a look towards the north and you might just spot them!

## July 2016 Night Sky

### Moon Phases

New	First Qtr	Full	Last Qtr
			
4th	12th	19th	27th

### Planets

#### Mercury

Mercury makes a very poor apparition in the evening sky this month. Being very low down in the bright evening sky it will be very difficult to spot. On 16th it will be about a moon width from Venus, so for a couple of days either side if you can see Venus try to spot Mercury close by.

#### Venus

Venus starts a rather poor apparition as the Evening Star this month around mid-month it sets about 45 mins after the Sun.

#### Mars

As the sky darkens Mars can be found low down in the south. Being brighter than any other object in that part of the sky and distinctly red in colour it is easy to recognise. We are now well past opposition and its size and brightness have diminished noticeably. If you have a telescope, observe it now before it is too late and it has shrunk in size too much.

#### Jupiter

Look low in the west after sunset to find Jupiter. It is very bright making it quite visible even though it is low down. It is now not well placed for observation; while the planet is high enough the atmosphere will be too turbulent for a clear view and as the evening progresses it gets to be too low down.

#### Saturn

Like Mars, Saturn can be found low in the southern sky after sunset. Look to the left of Mars for the fainter ringed yellow planet.

#### Uranus

It is still a little early in the year for observing the outer planets. The sky is getting light when they become placed high enough in the sky for observation. Uranus is not close to any stars that can be used as easy guides. Look for it above a line connecting Mu and Omicron Piscium.

#### Neptune

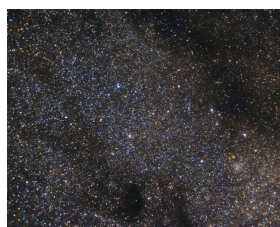
Look for Neptune about a moon diameter below the star Lambda Aquarii.

## Deep Sky



**M17 The Omega Nebula**  
RA 18h 21m Dec -16° 11' mag 7

If it were not for the Orion Nebula this would be the great show piece of the sky. Binoculars show the curved shape of this giant glowing gas cloud and stellar nursery. Some times called The Swan nebula, the swan swimming upside down through the Milky Way becomes more obvious through a small telescope.



**M24 Sagittarius Star Cloud**  
RA 18h 16m Dec 18° 43'

Probably the densest mass of stars you will ever see is contained within this 2 x 1 degree patch of sky towards the centre of our galaxy. A slight thinning in the density of gas and dust allows us a small peak towards the galactic core. This is an object for all instruments from a small pair of binoculars to a large telescope.



**M14 Globular Cluster**  
RA 17h 38m Dec -3° 15'  
mag 7.6

Despite its magnitude this is quite a difficult binocular object, it is quite large but does not have a particularly well condensed core. This means that the available light is spread out rather thinly. Larger aperture telescopes are needed to resolve some of the cluster stars.

*Peter Burgess*



## The Garlic Festival

*This annual event occurs on  
Sat-Sun August 20th-21st.*

As the largest show of its type on the Island it is an ideal opportunity to publicise the VAS and its activities. We traditionally exhibit with a couple of telescopes and a display in a small tent. There will be a telescope to raffle which always attracts considerable interest.



We can only do this if we have sufficient people to staff the tent. If you can spare at least half a day over the weekend I can arrange a rota to cover the opening times of 10.00 to 18.00. As an incentive you get a free ticket so can take a break and wander round the site – you may even meet the odd celebrity!



*Alex meets Kiki Dee*

We also supply a few Marshals for general duties around the site which generates useful income for the Society and helps keep subscriptions down!

If you are able to do either of these, please contact me on 883062 or 07503 212953, [richard.flux@iow.nhs.uk](mailto:richard.flux@iow.nhs.uk). Or see me at meetings or the observatory.

## Light Pollution Breakthrough in Freshwater



I'm sure all VAS members will welcome the news that HF Holidays in Freshwater have agreed to permanently turn off the floodlights which have spoiled the night sky in that area for years.

The decision comes after planning discussions with the Head of Operations at HF Holidays, their planning consultant and John Medland (Island Independent Councillor for Freshwater South).

**Thanks to all involved in making this happen.**

## What is Light Pollution?

Light pollution is a generic term referring to artificial light which shines where it is neither wanted nor needed. In broad terms, there are three types of light pollution:

**skyglow** – the pink or orange glow we see for miles around towns and cities, spreading deep into the countryside, caused by a scattering of artificial light by airborne dust and water droplets

**glare** – the uncomfortable brightness of a light source

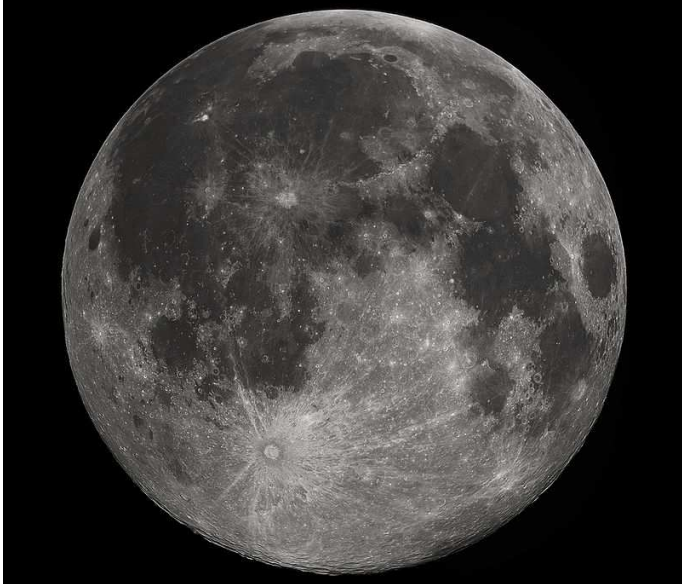
**light intrusion** – light spilling beyond the boundary of the property on which a light is located, sometimes shining through windows and curtains

There is increasing awareness of the impact that light pollution can have on wildlife, by interrupting natural rhythms including migration, reproduction and feeding patterns. Man-made light is known to cause confusion to migrating birds, often with fatal outcomes, and many of us will have heard birds singing late into the night in trees lit by a streetlight.

*Campaign to Protect Rural England*

# SILLY QUESTIONS?

WE ALL KNOW THAT THERE'S NO SUCH THING AS A SILLY QUESTION BUT.....



## Why do we only see one side of the moon?

We only see one side of the moon because it rotates around the Earth at the exact same speed as it rotates around its own axis, so that the same side of the moon is constantly facing the surface of the earth. This means that one full 'day' of the moon (the length of time it takes for the moon to rotate around itself once) is about 4 weeks long. If the moon didn't rotate at all, we would see all of its sides; the only way for us to see such a constant face of the moon is if it's also rotating.

The underlying reason why the moon rotates at this exact speed, forcing us to only see a single side of it, is because the moon has been tidally locked to the earth. Tidal locking is a stable configuration, and relatively easy to get to, given enough time, so many of our solar system's moons are found to be tidally locked, including the dwarf planet Pluto and its largest moon Charon, which are both tidally locked to each other.

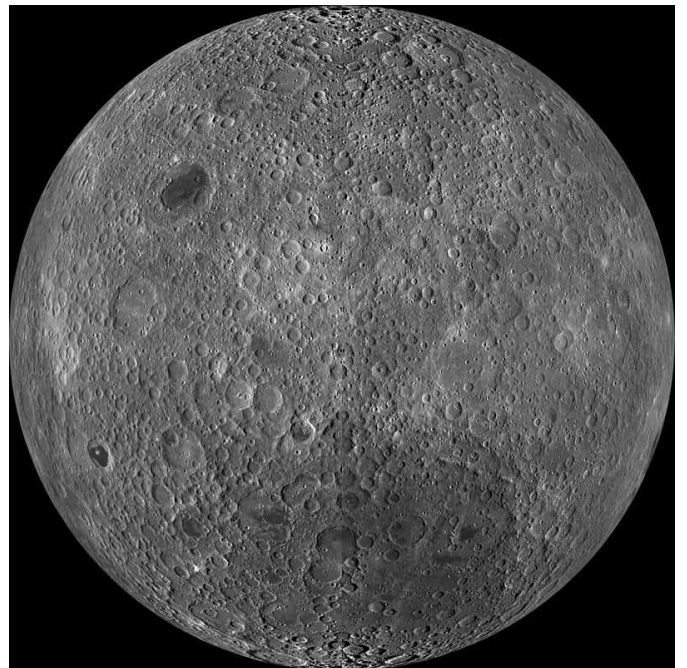
The "lock" part of this name refers to the way that an object - like the Moon - is apparently fixed in position, with one side always facing the other object. Any object which is found to be tidally locked will always have one side of itself facing the surface of the planet it's orbiting. The amount of time it takes to orbit around the planet will vary from object to object (Phobos, one of the moons of Mars, is tidally locked and orbits Mars every 8 hours), but as long as the object is tidally locked, the rotation will match the length of time it takes to orbit.

However, it's the "tidal" part of the tidal locking that gives us the real key to why tidal locking happens at all.

We're most familiar with tides as the effect of our oceans rising and falling due to the position of the moon. The Moon's gravity pulls on the earth, and the water on the surface of the Earth closest to the moon responds to that pull by elongating towards the moon. The water on other parts of the earth feels the Moon's gravitational pull as weaker, with the water on the opposite side of the earth feeling the weakest pull. However, these tidal forces also have another effect - they resist rotation.

The Moon was almost certainly not tidally locked when it first formed - at that time, it would have rotated at a faster speed, which meant that had any observer been on the early Earth, they could have seen all sides of the moon as it spun. However, the gravitational pull from the Earth - which like the tides due to the Moon, pulls on the side of the Moon closest to the earth more than the far side, resisted this faster rotation. This resistance due to the gravitational pull of the Earth gradually slowed down the faster spin of the Moon until the Moon was no longer rotating faster than it was orbiting. Once the Moon's rotation had slowed so much that a single face was always facing the surface of the Earth, it had officially been tidally locked, and has stayed in this configuration ever since.

The Moon also has the same influence on the Earth, but since the Moon is so much less massive than the Earth, this resistance to rotation takes a much longer time to impact the Earth's spin. However, it's still a measurable effect! The Moon is slowing down the rotation of the Earth by about 15 microseconds every year, gradually lengthening our days.



*The far side of the moon*



## What is 10 miles across, but powers an explosion brighter than the Milky Way?



COLUMBUS, Ohio—Right now, astronomers are viewing a ball of hot gas billions of light years away that is radiating the energy of hundreds of billions of suns. At its heart is an object a little larger than 10 miles across.

And astronomers are not entirely sure what it is.

If, as they suspect, the gas ball is the result of a supernova, then it's the most powerful supernova ever seen.

In this week's issue of the journal *Science*, they report that the object at the center could be a very rare type of star called a magnetar—but one so powerful that it pushes the energy limits allowed by physics.

An international team of professional and amateur astronomers spotted the possible supernova, now called ASASSN-15lh, when it first flared to life in June 2015.

Even in a discipline that regularly uses gigantic numbers to express size or distance, the case of this small but powerful mystery object in the center of the gas ball is so extreme that the team's co-principal investigator, Krzysztof Stanek of The Ohio State University, turned to the movie *This is Spinal Tap* to find a way to describe it.

"If it really is a magnetar, it's as if nature took everything we know about magnetars and turned it up to 11," Stanek said.

The gas ball surrounding the object can't be seen with the naked eye, because it's 3.8 billion light years away. But it was spotted by the All Sky Automated Survey for Supernovae (ASAS-SN, pronounced "assassin") collaboration. Led by Ohio State, the project uses a cadre of small telescopes around the world to detect bright objects in our local universe.

Though ASAS-SN has discovered some 250 supernovae since the collaboration began in 2014, the explosion that powered ASASSN-15lh stands out for its sheer magnitude. It is 200 times more powerful than the average supernova, 570 billion times brighter than our sun, and 20 times brighter than all the stars in our Milky Way Galaxy combined.

"We have to ask, how is that even possible?" said Stanek, professor of astronomy at Ohio State. "It takes a lot of energy to shine that bright, and that energy has to come from somewhere."

"The honest answer is at this point that we do not know what could be the power source for ASASSN-15lh," said Subo Dong, lead author of the *Science* paper and a Youth Qianren Research Professor of astronomy at the Kavli Institute for Astronomy and Astrophysics at Peking University.

He added that the discovery "may lead to new thinking and new observations of the whole class of superluminous supernova."

Todd Thompson, professor of astronomy at Ohio State, offered one possible explanation. The supernova could have spawned an extremely rare type of star called a millisecond magnetar, a rapidly spinning and very dense star with a very strong magnetic field.

To shine so bright, this particular magnetar would also have to spin at least 1,000 times a second, and convert all that rotational energy to light with nearly 100 percent efficiency, Thompson explained. It would be the most extreme example of a magnetar that scientists believe to be physically possible.

"Given those constraints," he said, "will we ever see anything more luminous than this? If it truly is a magnetar, then the answer is basically no."

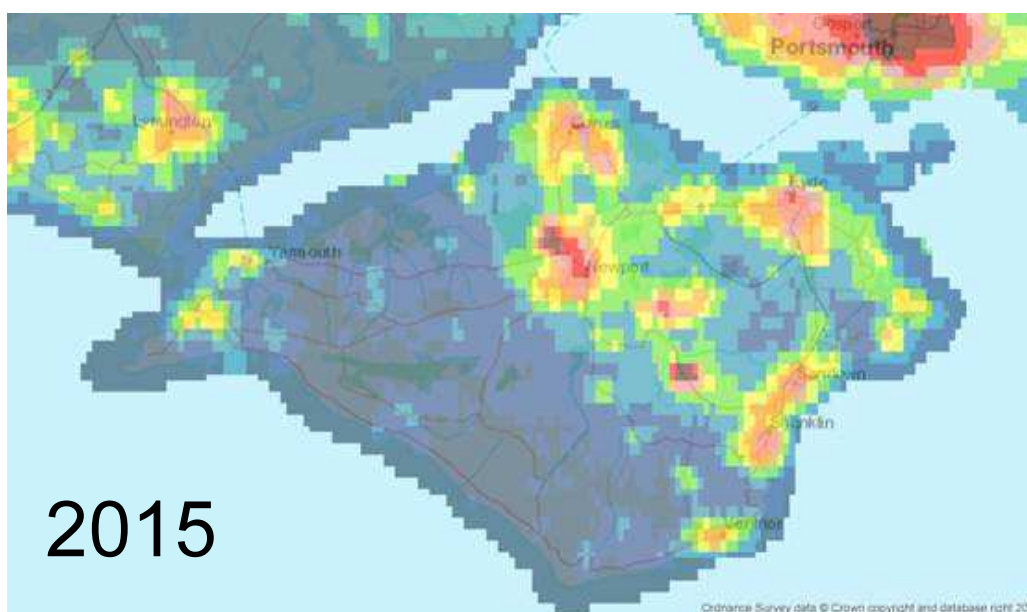
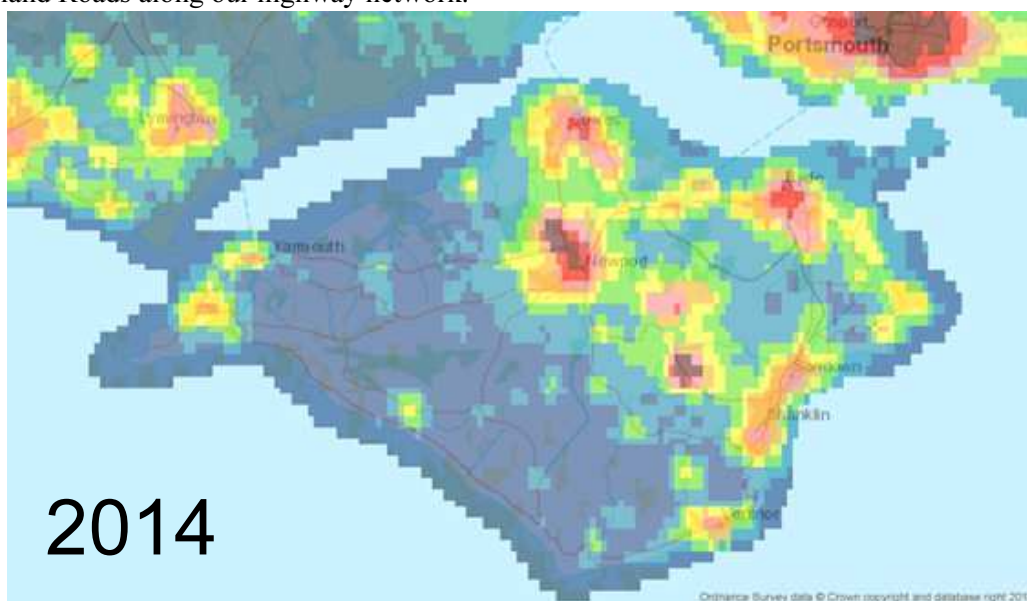
The Hubble Space Telescope will help settle the question later this year, in part because it will allow astronomers to see the host galaxy surrounding the object. If the team finds that the object lies in the very center of a large galaxy, then perhaps it's not a magnetar at all, and the gas around it is not evidence of a supernova, but instead some unusual nuclear activity around a supermassive black hole.

If so, then its bright light could herald a completely new kind of event, said study co-author Christopher Kochanek, professor of astronomy at Ohio State and the Ohio Eminent Scholar in Observational Cosmology. It would be something never before seen in the center of a galaxy.

More at: <https://news.osu.edu/>

## IW Night sky light pollution reduced

The national CPRE has released a long-awaited report on light pollution over the UK. I have extracted the images below that show that we now have much darker skies across the Island thanks to the spread of the new LED lighting campaign carried out by Island Roads along our highway network.



We are not complacent however since there is massive room for improvement yet to be addressed. From the images it can be seen just how much the light pollution of our skies has been improved over the last few years.

There still are notorious 'hot spots' such as the IW Prison complex that still has high intensity orange sodium lighting up into the night skies. Also there are some recently planning approved establishments that just do not seem to understand that upward lighting on buildings is a no-no these days (and nights!)

CPRE-IW have an annual Good Lighting Award presented to organisations and businesses that we would like to thank for their appreciation of the need to protect our dark skies.

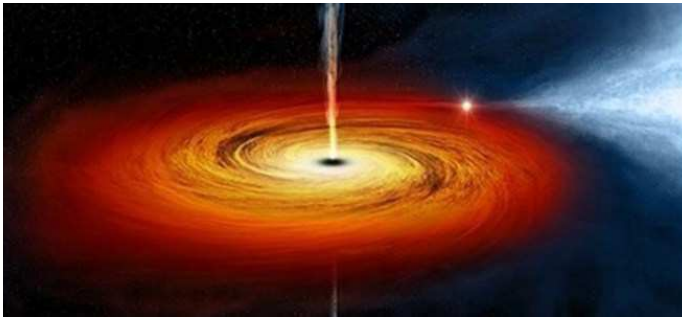
Further information at: <http://nightblight.cpre.org.uk/>

There is a case example about the IW in the consultant's report in paragraph 5.6 on page 21 and the maps on page 23.

*John Langley*



## How black hole jets punch out of their galaxies

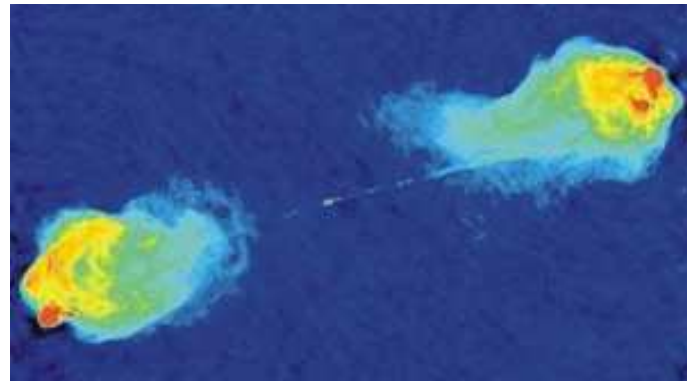


About 10 percent of all galaxies with active nuclei — all presumed to have supermassive black holes within the central bulge — are observed to have jets of gas spurting in opposite directions from the core. The hot ionized gas is propelled by the twisting magnetic fields of the rotating black hole, which can be as large as several billion suns.

A 40-year-old puzzle was why some jets are hefty and punch out of the galaxy into intergalactic space, while others are narrow and often fizzle out before reaching the edge of the galaxy. The answer could shed light on how galaxies and their central black holes evolve, since aborted jets are thought to roil (*to cause (someone or something) to become very agitated or disturbed.: to move in a violent and confused way*) the galaxy and slow star formation, while also slowing the infall of gas that has been feeding the voracious black hole. The model could also help astronomers understand other types of jets, such as those produced by individual stars, which we see as gamma-ray bursts or pulsars.

“Whereas it was rather easy to reproduce the stable jets in simulations, it turned out to be an extreme challenge to explain what causes the jets to fall apart,” said University of California, Berkeley theoretical astrophysicist Alexander Tchekhovskoy, a NASA Einstein postdoctoral fellow, who led the project. “To explain why some jets are unstable, researchers had to resort to explanations such as red giant stars in the jets’ path loading the jets with too much gas and making them heavy and unstable so that the jets fall apart.”

By taking into account the magnetic fields that generate these jets, Tchekhovskoy and colleague Omer Bromberg, a former Lyman Spitzer Jr. postdoctoral fellow at Princeton University, discovered that magnetic instabilities in the jet determine their fate. If the jet is not powerful enough to penetrate the surrounding gas, the jet becomes narrow or collimated, a shape prone to kinking and breaking. When this happens, the hot ionized gas funneled through the magnetic field spews into the galaxy, inflating a hot bubble of gas that generally heats up the galaxy.



*This false-color image of the radio jet and lobes in the very bright radio galaxy Cygnus A is an example of the powerful jets that can be produced by supermassive black holes at the cores of large galaxies. (Image by R. Perley, C. Carilli & J. Dreher)*

Powerful jets, however, are broader and able to punch through the surrounding gas into the intergalactic medium. The determining factors are the power of the jet and how quickly the gas density drops off with distance, typically dependent on the mass and radius of the galaxy core.

The simulation, which agrees well with observations, explains what has become known as the Fanaroff-Riley morphological dichotomy of jets, first pointed out by Bernie Fanaroff of South Africa and Julia Riley of the U.K. in 1974.

“We have shown that a jet can fall apart without any external perturbation, just because of the physics of the jet,” Tchekhovskoy said. He and Bromberg, who is currently at the Hebrew University of Jerusalem in Israel, will publish their simulations on June 17 in the journal *Monthly Notices of the Royal Astronomical Society*, a publication of Oxford University Press.

*The supermassive black hole in the bulging center of these massive galaxies is like a pitted olive spinning around an axle through the hole, Tchekhovskoy said. If you thread a strand of spaghetti through the hole, representing a magnetic field, then the spinning olive will coil the spaghetti like a spring. The spinning, coiled magnetic fields act like a flexible drill trying to penetrate the surrounding gas.*

Much more at: <http://www.deepstuff.org/>

## Nasa's Juno is Only Days From Reaching its Orbit Around Jupiter

*On July 4 Juno will sail above the cloud tops of the largest planet in the solar system.*



*Credit: By Kevin Gill from Nashua, NH, United States CC-BY-SA-2.0 via Wikimedia Commons*

Juno is at approximately 12, 2 million km (7.6 million miles) from reaching Jupiter. Upon arriving to the planned distance from Jupiter, the main engine will ignite for 35 minutes, locking it at a polar orbit around the giant planet, at about 4,600 km (2858 miles). For over a year, Juno will examine the radiation belts, auroras, and below the dark clouds of gas into the interior of Jupiter.

### Threats of hydrogen under strong pressure

This will be the closest distance that any spacecraft is from Jupiter. In 1974 NASA's pioneer 11's closest approach to Jupiter only reached 43,000 km (27,000 miles). Scientists think that Juno approaching Jupiter presents serious risks to the spacecraft, as below the cloud tops where Juno will fly, there is a layer of highly pressurized hydrogen that functions as an electrical conductor.

### Polar orbit around Jupiter

It's believed that the combination of hydrogen along with the planets rotation produces a strong magnetic field where electron, protons and ions move at the speed of light. Juno might be exposed to strong radiation equivalent to one hundred million times the X-rays used in hospitals; however the polar orbit that Juno is intended to take places it under the belt that radiates highly energetic particles, allowing the spacecraft to have a longer useful life. Juno's

orbit is like a squashed oval that approaches Jupiter at the North Pole and then descends below the radiation belts, as Juno flies toward Jupiter's South Pole. Juno's orbit was designed to manoeuvre the spacecraft away from the nearing the harmful radiation.

### Titanium vault to protect against radiation

Juno is equipped with special shielding that protects its electrical wiring and sensors from the harmful radiation. The highest protective piece of equipment which Juno carries is a titanium vault, which encloses Juno's flight computer and the main electronic science components of the mission. This titanium vault is intended to reduce the radiation exposure by about 600 times from the one affecting the exterior; resulting in Spacecraft Juno's long lasting performance in that orbit.

Without the protective vault of titanium, it's thought that Juno would not be able to perform a single flyby around Jupiter. While the extreme radiation found in Jupiter, over time might be able to cause damage to the overall spacecraft, the polar orbit will allow Juno to perform science studies for approximately 20 months, a sufficient amount of time to gather useful information from the gas giant, including important data about the origins of life.

*From: <http://uk.blastingnews.com/>*

## There could be at least 2 more planets in our Solar System

If you were still getting your head around the concept of the mysterious Planet Nine potentially tracing its elusive orbit somewhere around the fringe of the Solar System, try this on for size.

A team of astronomers has performed new calculations on the data that originally gave rise to the Planet Nine hypothesis, and these new numbers suggest that the hypothetical extra planet might not be alone – there could be multiple planets hiding at the edge of our Solar System that we've yet to discover. If the researchers are correct – which nobody knows for sure right now – it could really mean a do-over for the high school textbooks.

But first, let's backtrack a little to explain how we got to this point. In January, researchers from the California Institute of Technology (Caltech) found evidence for what they call Planet Nine, a huge icy planet that could be lurking somewhere beyond Neptune in the far reaches of our Solar System.

*More at: <http://www.sciencealert.com/>*

## VAS Officers and Committee Nominations 2016/17

For those wishing to stand for election at the AGM of the Society to be held on Friday 26th August 2016 at 7.00pm.

### Name and Address of Nominee:

### Standing for

- Chairman .....
- Treasurer.....
- Secretary .....
- Observatory Director.....
- Membership Secretary.....
- Programme Organiser.....
- Committee .....

Proposed by: .....

Seconded by: .....

Signature of Nominee:.....

### Notes

- The Committee meets once each month usually on a Thursday evening before the usual club night.
- No person can be elected to more than one position.
- Only adult fully paid-up members may stand for election (or propose or second).
- All completed nomination forms to be received by the Secretary at least 7 days before the AGM.
- The Committee consists of not less than six members.



## THE BACK PAGE

LINKS, COMMENTS AND OBSERVATIONS

### Pavilion Building Work

***The Pavilion update is fully underway and the area is now a "building site"***

***Anyone visiting the observatory must use a torch to ensure their own safety***

***The paths to the observatory are fenced off and cannot be used***

***Please be very careful when visiting the observatory in the dark!***

### National Trust Events 2016

The National Trust are holding 2 events again this year and have asked VAS to attend:

**A Camping event at Newtown on 16th July  
and**

**A Night event at Mottistone Manor on 31st August**

The Newtown event is considerably smaller than the Mottistone one but it would be good to have volunteers for both who can attend with telescopes or binoculars.

***Please let me know if you can help as soon as possible***

### What happens in August?

Well we all know don't we? of course we do, it's AGM time and that's when your VAS Committee all look forward to a great rush of nominations to take over their positions.

**This is your big chance**, please volunteer to join the Committee. Although it's not too onerous some of us need a rest as we have been in post for a number of years, any help is welcomed.

There is a Nomination form on Page 11.

**Please consider joining us**

### Observatory

When visiting the VAS observatory, for your own safety, please bring a torch. Also, please make sure you close and lock the car park gate if you are the last to leave - if you need the combination to the lock, please contact a member of the committee.

### Articles Needed

New Zenith needs letters, articles, reviews or pictures related to astronomy. Contributions to the Editor at the email or postal address on the front page.

*"If everything happens for a reason that means you made the right choice even when it's the wrong choice"*

**Lil Treyco**

*"It's very hard to talk quantum using a language originally designed to tell other monkeys where the ripe fruit is"*

**Terry Pratchett**

*"I have always wished that my computer would be as easy to use as my telephone. My wish has come true. I no longer know how to use my telephone"*

**Bjarne Stroustrup**